CLAIMS

1. A method of constructing orthogonal codes of length N for use in a network utilizing quasi-synchronous code division multiple access combined with time division duplexing, the method comprising:

a) determining the balanced vectors of length N, being all possible cross-correlation vectors resulting from zero cross-correlation of codes of length N;

b) providing an arbitrary code of length N;

c) performing bitwise XOR-ing with all the balanced vectors determined in a), to produce a set of codes with which the arbitrary code is orthogonal;

d) performing bitwise XOR-ing of the balanced vectors determined in a);

e) adding the code to a set of orthogonal codes if the result of d) is balanced;

f) performing a) through e) until the set of orthogonal codes contains maximally N orthogonal codes; and

g) applying the set of orthogonal codes to a plurality of data streams in the network so as to provide spread spectrum data streams.

2. The method defined in Claim 1, wherein the network comprises a satellite communications network having mobile and fixed terminals.

3. The method defined in Claim 1, wherein the network comprises a cellular communications network.

4. The method defined in Claim 1, wherein the network comprises a short-range terrestrial communications network.

5. A computer usable medium having computer readable program code embodied therein for constructing orthogonal codes of length N for use in a network utilizing quasi-synchronous code division multiple access combined with time division duplexing, the computer readable code comprising instructions for:

a) determining the balanced vectors of length N, being all possible cross-correlation vectors resulting from zero cross-correlation of codes of length N;

b) providing an arbitrary code of length N;

c) performing bitwise XOR-ing with all the balanced vectors determined in a), to produce a set of codes with which the arbitrary code is orthogonal;

d) performing bitwise XOR-ing of the balanced vectors determined in a);

e) adding the code to a set of orthogonal codes if the result of d) is balanced;

f) performing a) through e) until the set of orthogonal codes contains maximally N orthogonal codes; and

g) applying the set of orthogonal codes to a plurality of data streams in the network so as to provide spread spectrum data streams.

6. A system for constructing orthogonal codes of length N for use in a network utilizing quasi-synchronous code division multiple access combined with time division duplexing, the system comprising:

a) means for determining the balanced vectors of length N, being all possible cross-correlation vectors resulting from zero cross-correlation of codes of length N;

b) means for providing an arbitrary code of length N;

c) means for performing bitwise XOR-ing with all the balanced vectors determined in a), to produce a set of codes with which the arbitrary code is orthogonal;

d) means for performing bitwise XOR-ing of the balanced vectors determined in a);

e) means for adding the code to a set of orthogonal codes if the result of d) is balanced;

f) means for performing a) through e) until the set of orthogonal codes contains maximally N orthogonal codes; and

g) means for applying the set of orthogonal codes to a plurality of data streams in the network so as to provide spread spectrum data streams.

7. The system defined in Claim 6, wherein the system is embodied as an integrated circuit.

8. A method of constructing orthogonal codes of length N for use in a network utilizing quasi-synchronous code division multiple access combined with time division duplexing, the method comprising:

a) determining the balanced codes of length N, being all possible cross-correlation codes resulting from zero cross-correlation of codes of length N;

b) providing an arbitrary code of length N;

c) performing bitwise XOR-ing of said arbitrary code with all the balanced codes determined in a), to produce code sets of orthogonal codes, each code set corresponding to the balanced vector used to produce said code set and each including the arbitrary code;

d) performing bitwise XOR-ing of one of the set of balanced codes with each of the other members of the set of balanced codes;

e) for each of said bitwise XOR-ing operations in d): if the result is balanced, adding said balanced result to a new set of balanced codes and merging the two code sets corresponding to the two balanced codes that resulted in said balanced result in d) to a new code set corresponding to said balanced result;

f) replacing said set of balanced codes in d) with said new set of balanced codes obtained in e);

g) performing d) through f) until the number of codes in said code sets equals N; and

h) applying the set of orthogonal codes to a plurality of data streams in the network so as to provide spread spectrum data streams.

9. The method defined in Claim 8, wherein the network comprises a satellite communications network having mobile and fixed terminals.

10. The method defined in Claim 8, wherein the network comprises a cellular communications network.

11. The method defined in Claim 8, wherein the network comprises a short-range terrestrial communications network.

12. A computer usable medium having computer readable program code embodied therein for constructing orthogonal codes of length N for use in a network utilizing quasi-synchronous code division multiple access combined with time division duplexing, the computer readable code comprising instructions for:

a) determining the balanced codes of length N, being all possible cross-correlation codes resulting from zero cross-correlation of codes of length N;

b) providing an arbitrary code of length N;

c) performing bitwise XOR-ing of said arbitrary code

with all the balanced codes determined in a), to produce code sets of orthogonal codes, each code set corresponding to the balanced vector used to produce said code set and each including the arbitrary code;

d) performing bitwise XOR-ing of one of the set of balanced codes with each of the other members of the set of balanced codes;

e) for each of said bitwise XOR-ing operations in d): if the result is balanced, adding said balanced result to a new set of balanced codes and merging the two code sets corresponding to the two balanced codes that resulted in said balanced result in d) to a new code set corresponding to said balanced result;

f) replacing said set of balanced codes in d) with said new set of balanced codes obtained in e);

g) performing d) through f) until the number of codes in said code sets equals N; and

h) applying the set of orthogonal codes to a plurality of data streams in the network so as to provide spread spectrum data streams.

13. A system for constructing orthogonal codes of length N for use in a network utilizing quasi-synchronous code division multiple access combined with time division duplexing, the system comprising:

a) means for determining the balanced codes of length

N, being all possible cross-correlation codes resulting from zero cross-correlation of codes of length N;

b) means for providing an arbitrary code of length N;

c) means for performing bitwise XOR-ing of said arbitrary code with all the balanced codes determined in a), to produce code sets of orthogonal codes, each code set corresponding to the balanced vector used to produce said code set and each including the arbitrary code;

d) means for performing bitwise XOR-ing of one of the set of balanced codes with each of the other members of the set of balanced codes;

e) means for each of said bitwise XOR-ing operations in d): if the result is balanced, adding said balanced result to a new set of balanced codes and merging the two code sets corresponding to the two balanced codes that resulted in said balanced result in d) to a new code set corresponding to said balanced result;

f) means for replacing said set of balanced codes in d) with said new set of balanced codes obtained in e);

g) means for performing d) through f) until the number of codes in said code sets equals N; and

h) means for applying the set of orthogonal codes to a plurality of data streams in the network so as to provide spread spectrum data streams.

14. The system defined in Claim 13, wherein

the system is embodied as an integrated circuit.